CONTINGENCY CONTRACTING WITH DISADVANTAGED YOUTHS: IMPROVING CLASSROOM PERFORMANCE

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This study evaluated the effects of a student-teacher contracting procedure on adolescent students' academic productivity. Participants were 13 youths enrolled in a vocational training program for disadvantaged youth and their classroom teacher. During the baseline conditions students were paid contingent on attendance alone, the system operating in the program prior to this research. During contracting conditions students were paid contingent on contract fulfillment of academic productivity goals set by mutual agreement between the student and teacher. Contracting and contingent pay procedures were developed with, and implemented by, the classroom teacher. A reversal experimental design showed that student's productivity more than doubled during contracting conditions as compared with their productivity during baseline.

DESCRIPTORS: contingency contracting, academic behavior, adolescents

Educators, government officials, and members of society at large have shown increased concern about the behavior of adolescents in academic and vocational settings (Clark, Boyd, & Macrae, 1975; Duke & Perry, 1978). Major concerns have included academic deficits, truancy, and unemployment after leaving school. Unfortunately, many high school graduates and dropouts apparently have not acquired the basic mathematics and reading skills necessary for independent adult functioning and successful employment.

Behavior analysts recognizing the serious implications of academic deficits in young people

have developed programs targeting academic performance. A number of studies have used contingency management to increase adolescent students' performance of academic process behavior such as paying attention or staying on task (Long & Williams, 1973; McAllister, Stachowiak, Baer, & Conderman, 1969; Wilson & Hopkins, 1973). Other studies increased levels of academic performance with the contingent delivery of rewards (Hall, Christler, Cranston, & Tucker, 1970; Kirby & Shields, 1972).

Although the effectiveness of contingency management with adolescents has been well documented, the comparative efficacy of targeting academic process behavior rather than levels of academic skill performance has been questioned. Several authors have suggested that modifying students' skill levels is a more efficient procedure than modifying such process behavior as paying attention. Kirby and Shields (1972), for example, reported that when a student's mathematics computation rate was increased with the contingent delivery of feedback and praise, the student's attentiveness increased concurrently. They suggested that modifying an academic response rate may be more efficient than modifying a process behavior because in the former instance

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teachers are not required to monitor constantly students' studying. A similar conclusion was reached by McLaughlin and Malaby (1972) who reported that fifth and sixth graders completed substantially more assignments when they were rewarded for assignment completion than when they were rewarded for quietness and attentiveness.

Together, the studies by Kirby and Shields (1972) and McLaughlin and Malaby (1972) suggest that targeting productivity rather than attentiveness is a more effective means of increasing students' academic performance. However, in some settings, such as special education classrooms where students exhibit diverse skill levels, modifying productivity across an entire classroom of students may be difficult. In such situations, increasing productivity via contingency management would require teachers to specify and reward different topographies of criterion academic performance for individual students.

Another issue to consider in the treatment of adolescents' classroom behavior problems is the use of teachers versus the students as program mediators. The literature shows a predominance of teacher-administered programs with adolescents participating in the change process only as passive recipients. Although such studies effectively modified adolescents' classroom behavior problems, they have not appreciated adolescents' developmental status as individuals soon to enter adulthood. Self-management programs, in contrast, can target academic behavior and incorporate students' acquisition of such important life skills as goal setting, goal achievement, and self-responsibility. Self-management has been applauded as a more ethical, less restrictive alternative to therapist- or adult-moderated interventions in that the client takes an active role in the change process (Williams & Long, 1975).

This study used student-teacher contingency contracting with behavior problem adolescents. Contracting between students and teachers allows both parties to negotiate the amount of student behavior required to earn specific re-

wards. Such a procedure provides students with opportunities to practice setting and achieving goals without requiring the teacher to relinquish all control over the program. Thus, contingency contracting affords students with some of the opportunities of self-management without relying on them as the sole program administrators.

Contracting has been frequently used to reduce family or marital conflict (Jacobson, 1977) and to increase adherence to weight control programs (Mann, 1972), but it has been used less frequently in the schools. Schwartz (1977), providing one of the few examples of a school-based contingency contracting program, used the procedure for remediating reading deficits in seventh graders. Schwartz (1977) reported that contracting between students and teachers was effective in increasing the students' reading scores on an achievement test. However, several aspects of the study limited the conclusions to be drawn from the results. First, Schwartz did not report information on student productivity, i.e., number of reading assignments completed correctly. Second, Schwartz used contracting with only a select group of students. It is unknown whether contracting would be generalizable to a regular classroom setting where teachers used the procedure with an entire class.

The current study evaluated the effects of student-teacher contingency contracting on the productivity of students enrolled in a special education program for disadvantaged adolescents. The intervention rearranged students' pay for program participation so that pay was earned for contract fulfillment rather than attendance. Similar contingent pay has been used by Pierce and Risley (1974), who evaluated the effects of pay for attendance vs. job performance by youths enrolled in a CETA-funded program. The authors found that when the youths were paid contingent on their performance in various recreational center jobs (e.g., snack bar attendant, custodian), their performance substantially increased.

The current study evaluated the effects of a student-teacher contracting program on produc-

tivity for an entire class. Thus, it differs from previous studies by virtue of its comprehensiveness in targeting an entire class and in allowing for active student participation without eliminating teacher involvement.

METHOD

Participants

The participants were 1 female and 12 male students enrolled in a vocational/educational training program for disadvantaged, high school dropouts between the ages of 16 yr and 21 yr (mean = 18). The participants had dropped out of the regular junior high or high school for a variety of reasons including disinterest in school, family problems, pregnancy, and poor relations with school authorities.

Seven of the 13 participants were enrolled in the program during all four experimental conditions and the other six were enrolled only during two or three conditions. All attended school at a vocational training center that primarily served students from surrounding high schools. Students participating in the study received 2.5 h of vocational training and 2.5 h of basic educational skills training in preparation for their high school diploma equivalency (GED) examination. Participants received \$2.35 for each hour they attended school.

Prior to the onset of the study the students' program administrator reported having minimal control over the students' behavior in the academic skills setting. As she did not control the students' pay, the administrator believed her only means of controlling students was to threaten them with termination from the program. Her threats and reprimands reportedly were ineffective: Students completed minimal or no work despite the administrator's frequent, coercive attempts to motivate them. The program administrator reported that students appeared less interested in their academic training than in their vocational training. However, a high school diploma was necessary to obtain future jobs in preferred vocational areas.

Setting

The research was conducted in the basic education classroom at the vocational training center. Students worked each day in self-paced mathematics, reading, and English textbooks. Half the students attended the class in the morning and half in the afternoon. A male teacher with a bachelor's degree tutored students and graded their academic work each day.

Dependent Measure

The major dependent measure was the number of workbook items completed correctly by students and percentage of completed items that were correct. An item was defined as the smallest component within a unit, distinguished from another item numerically or alphabetically. Examples of items were:

1. Define the word, "superimpose":
2. In two sentences describe what happened to Paul when he applied for the job.

The scoring rules were developed in consultation with the teacher. In addition to the teacher grading of student work, all work was regarded by two undergraduate research assistants. The data reported here are those obtained by the assistants.

Reliability

Interscorer reliability between the research assistants was obtained on 25% of all student worksheets during each experimental condition. The percent agreement between graders was calculated by dividing the higher frequency by the lower frequency reported and then multiplying the number by 100. The mean interscorer agreement averaged across conditions was 99% (range = 97%-99%) for correctly answered items and 97% (range = 93%-97%) for incorrectly answered items. Reliability between the teacher and the research assistants was obtained on a random sample of student work during each condition. The agreement between the teacher and the research assistants averaged

97% for correct items and 91% for incorrect items.

Procedure

Preparatory system changes. A number of state and county level policy changes were required to conduct the research. Prior to data collection, permission to conduct the research as well as an agreement to modify several existing policies had to be obtained from various governmental agencies. During initial contacts with these individuals the research procedures and potential benefits of the research were outlined. After obtaining approval to conduct the research, modifications were effected in the student pay procedure so that students could be paid frequently and immediately following their contract fulfillment. Prior to data collection students were paid bimonthly with a 2-wk delay pay schedule. However, after considerable discussion concerning the various pay options, the program officials agreed to send quarterly payments to a local community mental health center which would directly administer the monies after payment of accounting and administration costs. The mental health center agreed to write students' checks on a weekly basis.

Baseline I. During Baseline I, students completed exercises in their self-paced workbooks. At the end of each day, students turned in the completed work to the classroom teacher. The teacher graded the students' work that day or evening and allowed students to review their work after it was graded. The teacher was instructed to discipline the students as he normally did (e.g., reprimand, prompt, or threaten). Students were paid every Friday based on their attendance during the preceding Friday through Thursday.

Contracting I. Just prior to intervention, students were told their pay would now be earned according to the number of correct workbook items they completed daily but they could still earn as much money as they currently earned (\$35.50 a week). They were told that each week they and the teacher would agree on a specific

number of items to be completed daily during the subsequent week. Students were assured that contracts would specify levels of work that were reasonable and fair but that, once established, the contract was nonnegotiable until the next week. Contracts specified five daily goals and a total weekly goal. Finally, the contingent pay procedures were described verbally and in writing to the students.

The contingent pay procedure specified how much money students could earn for daily and weekly goal achievement. Students earned more money each day they reached their goals. For example, on the first day of the week students reached their goals they earned \$3; the second day \$4; and so on. Students also were rewarded for weekly goal achievement. Weekly goals were achieved when the student completed the total problems specified in the five daily goals. Rewarding students for weekly goal achievement was included so that students were rewarded for "catching up" on their work when they had been absent or had failed to complete a daily goal. The student pay procedure contained an implicit contingency on attendance: Students would only earn pay on days they both attended school and did their work.

After a thorough explanation of the contracting and contingent pay procedures, each student and their classroom teacher negotiated a contract for the next week. While negotiating a contract for the first time, the teacher suggested a figure that represented at least a 10% increase over the student's current level of productivity. The amount varied somewhat depending on the student's level of productivity during Baseline I. With regard to the amount contracted, the teacher and the student usually agreed on a number that represented a compromise between his suggested workload and the workload proposed by the student.

Throughout the Contracting I condition, the negotiation process between the students and the teacher generally remained the same. The only change that occurred was that over time some students did not increase their goals substantially

from week to week once they reached an acceptable level of productivity. An acceptable level was determined by the time the student spent completing their contracts during the previous week.

The teacher continued to grade all student work according to the scoring rules used during Baseline I. In addition, he determined the amount of money earned by students based on the degree to which they completed the work specified in their contract.

Baseline II. Just prior to the beginning of the Baseline II condition, students were informed that contracting would be discontinued and that their pay would again be earned by their school attendance. They were told that contracting seemed unnecessary given that they had increased their productivity to acceptable levels. The teacher was instructed to continue to grade the students' work and to use the same disciplinary procedures used during Baseline I.

Contracting II. This condition was conducted in the same manner as the Contracting I condition.

RESULTS

The following section describes the results obtained for students who participated in the study during all four experimental conditions ($N = 7$). Figure 1 presents the number of correct items completed by each student.

Bill. As seen in Figure 1, Bill completed substantially more correct items during contracting conditions than he did during baseline conditions. Bill averaged 20 correct items during Baseline I and 68 correct items during Contracting I. Similarly, Bill's performance dropped to a low mean of 16 correct items during Baseline II but increased to a mean 103 correct items during Contracting II. Bill's performance trended upward across the two contracting conditions. The percentage of items completed by Bill that were correct remained high across the four experimental conditions (94%, 94%, 99%, and 93% of completed items were correct).

Scott. Scott's performance showed substantial improvement during contracting conditions as compared to his baseline levels. During Baseline I, Scott's performance was low (mean = 17) and variable. However, during Contracting I his productivity increased in rate (mean = 63) and decreased in variability. Scott completed a mean 8 correct items during Baseline II and 49 correct items during Contracting II. The mean percentage of items answered correctly by Scott was 81, 87, 59, and 81 across the four experimental conditions.

Klonsal. Klonsal answered a mean 22 items correctly during Baseline I and 34 items during Contracting I. Klonsal's performance dropped substantially to a mean 7 correct items during Baseline II. Thus, his Baseline II performance was substantially less than that of Baseline I. However, Klonsal exhibited a clear and dramatic increase in productivity during Contracting II (mean = 67). Klonsal answered a mean 85%, 78%, 92%, and 72% of all items correctly during the four experimental phases.

Clyde. Clyde's performance during Baseline I averaged 35 correct items and was dichotomous. On days Clyde correctly answered any problems ($N = 9$) his performance was high. However, on 12 days he did not answer any problems. Clyde's performance significantly increased to a mean 66 correct items during Contracting I. Clyde averaged 30 correct items during Baseline II and a high 92 correct items during Contracting II. Across the four experimental conditions, Clyde answered a mean 99%, 95%, 93%, and 94% of attempted items correctly.

Jeff. Jeff attended school for only four days during Baseline I. Therefore, the comparability of his data during that condition to the subsequent conditions is limited. Figure 1 shows that Jeff completed substantially more correct items during Contracting I (mean = 56) than he completed during Baseline I (mean = 34). Jeff's performance during Baseline II averaged only 5 correct items. However, during Contracting II he completed a daily mean of 76 correct items. The percentage of problems answered correctly

Fig. 1. Number of items completed by the students during baseline and contracting conditions. Missing data points represent student absences.

by Jeff declined slightly across the four conditions, with means of 90%, 84%, 82%, and 80% across conditions.

Rob. Rob attended school for only eight days during the final condition. Rob left the program because he obtained employment in the community. During Baseline I, Rob correctly completed an average of 12 items daily. However, when Rob was paid contingent on contract fulfillment, the number of correct items completed by him more than tripled (mean = 39). Rob's performance during Baseline II averaged only 5 correct items a day. With the implementation of

the second contracting condition, the number of items Rob answered correctly immediately increased to a mean of 54. The percentage of items answered correctly by Rob was somewhat lower during contracting conditions than during baseline conditions; the means across conditions were 88%, 84%, 87%, and 78%, respectively.

Todd. Todd completed a daily mean of 3 correct items during Baseline I. During Contracting I, Todd's performance showed a marked increase (mean = 34) and trended upward across the condition. The mean number of correct items completed by Todd was 2 during Baseline II. On

the single day Todd attended school during Contracting II, he completed 25 correct items. Todd was terminated from the program during the Contracting II condition due to his excessive absences. The mean percent correct of items answered correctly by Todd across conditions were 79%, 76%, 80%, and 83%.

Attendance. The mean percentage of students present throughout each condition were calculated from teachers' records: 85% attended during Baseline I, 91% during Contracting I, 82% during Baseline II, and 94% during Contracting II.

Student progress. During all experimental phases, the assignments completed by students were recorded. These data were evaluated to determine whether the students worked progressively through their workbooks. The data indicated that this, in fact, did occur. The students did not, for example, complete easier work during contracting conditions than they completed during baseline conditions.

DISCUSSION

Student-teacher contracting with pay contingent on contract fulfillment was effective in increasing the productivity of disadvantaged youths enrolled in a vocational training program. Increased student productivity was integral to the students' future employment. By increasing their productivity, students progressed more rapidly through their workbooks, thus facilitating more rapid mastery of the academic material necessary to passing the GED. Obtaining the GED was a prerequisite for hiring in many of their preferred vocational choices. Of the seven participants, five obtained their GED and were either employed or in college upon leaving the program. One other student passed some subtests of the GED test and was employed in the vocational area for which he was trained. Only one student did not obtain his GED; that student was employed.

This study addressed several issues raised in other research that modified adolescent students' academic performance. In particular, this study

targeted academic productivity directly rather than indirectly. It was demonstrated that student productivity more than doubled when the students earned their pay contingent on academic performance. Anecdotally, the classroom teacher reported that the contingency resulted in the students' increased task-oriented behavior. For example, the students appeared to be more punctual returning from breaks.

Student-teacher contracting has rarely been used to modify the academic performance of adolescent students. The present study showed that contracting could be used effectively with all students in one program across several academic subject areas. Individualized contracting and contingent pay became an integral component of the students' environment.

In addition to the fact that contingency contracting was effective in increasing productivity, both the students and the teacher reported preferring contracting conditions over baseline conditions. The teacher reported that contracting required minimal time to administer (10 min a week per student) and provided him a designated opportunity to plan and evaluate students' lessons and monitor their progress.

The students reported a preference for contracting because during contracting, they and their teacher knew how much work they had to do each day. Consequently, when students finished their work, they could not be reprimanded for wasting time. In addition, several students told the researchers that by defining and achieving goals, they felt a greater sense of accomplishment during contracting than baseline conditions.

Several additional aspects of the results are noteworthy. The students' performance generally showed an upward trend across both contracting conditions. The most plausible explanation for the upward trends that occurred during intervention conditions was that, over time, both the students and the teacher learned how much work the students were able to do and therefore increased work requirements. These upward trends in performance occurred in spite of the

fact that students' workbooks increased in difficulty. In addition, during baseline conditions, students worked in the subjects of their choice whereas during intervention, students negotiated how much work was to be completed in all academic areas. Thus, during contracting conditions, students could not avoid doing work in difficult subjects.

This study was intended to evaluate a procedure that would enhance student productivity. No attempt was made to promote generalization of treatment effects in the absence of contingency contracting. The results showed that student-teacher contracting with pay contingent on performance was effective in substantially increasing productivity but that maintenance of treatment effects did not occur. While these results were expected and were methodologically advantageous, they could be considered unfortunate from a clinical perspective. It is suggested that future research evaluate procedures for enhancing maintenance of treatment effects obtained with student-teacher contracting. For example, future research might evaluate the use of students' use of self-management techniques, such as self-monitoring, as treatment maintenance strategies.

Several methodological issues were raised by this study. For example, our observation indicated that students' work contracts were truly generated via student-teacher negotiation. Anecdotal, the students reported that their teacher encouraged, and was responsive to, their suggestions during the negotiation process. However, empirical documentation of the negotiation process was not obtained. It is recommended that future research examine the interactions between students and teachers while negotiating contracts. Such an analysis would document the negotiation process, provide information on teacher and student behavior important to effective contracting, and might point to procedures for facilitating students' acquisition of goal setting and negotiation skills.

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